

LEMBERG, A.A., prof. (Khar'kov)

Teaching roentgenology and radiology in the Ukrainian Institute for
Postgraduate Medical Education. Vest. rent. i rad. 37 no.2:78-79
Mr-Ap '62. (MIRA 15:4)

(RADIOLOGY, MEDICAL--STUDY AND TEACHING)

LEMBERG, A. A.

"Microscopy and x-ray examinations of coronary artleries."

Radiology Congress, Karlovy Vary, Czechoslovakia, 10-14 June 63

LEMBERG, A.A., prof.; BURIA-MENKO, G.I., prof.

Fourth Congress of Roentgenologists and Radiologists of the
Ukrainian S.S.R. Vestn. rent. i rad. 38 no.6, 67-69 NLE '80.
(MIRA 1786,

LEMBERG, A.A., prof.

"Tumors of the skeleton" by T.G. Lagunova. Vop. onk. 9 no.12:
104 '63. (MIRA 17:12)

KHOMENKO, A.G.; TISHCHENKO, M.A.; LEMBERG, A.A.

Causes of the ineffectiveness of antibacterial treatment and collapse therapy in cavernous tuberculosis of the lungs. Probl. tub. no.2:43-48 '64.

(MIRA 17:12)

1. Kafedra tuberkuleza (zav. -- dotsent A.G.Khomenko), patologicheskoy anatomii (zav. -- prof. M.A.Tishchenko) i rentgenologii i radiologii (zav. -- prof. A.A.Lemberg) Ukrainskogo instituta usovershenstvovaniya vrachey, Khar'kov.

LEMBERG, A.A., prof.

Georgii Andreevich Burlachenko; on his 70th birthday. Vest. rent.
i rad. 39 no.1:76-77 Ja-F '64. (MIPA 18:2)

1. Predsedatel' prevleniya Khar'kovskogo oblastnogo nauchnogo
obshchestva rentgenologov i radiologov.

LL454G, A.Ya., inzhener.

Selection of the optimum air gap under the main pole of an
uncompensated direct-current machine. Vest.electroprov. 27 no.7:
63-65 J1 '56. (MLRA 10:8)

I.Khav'kovskiy elektromekhanicheskii zavod,
(Electric machinery)

110-6-17/24

AUTHOR: Lemberg, A.Ya., Engineer.

TITLE: On the design of the most powerful possible generator for a diesel electric locomotive using single armature construction. (K voprosu proyektirovaniya moshchnogo predel'no ispol'zovannogo teplovnogo generatora v odnoyakorom ispolnenii.)

PERIODICAL: "Vestnik Elektropromyshlennosti" (Journal of the Electrical Industry) 1957, Vol. 28, No. 6, pp. 60-61 (U.S.S.R.)

ABSTRACT: The article sets out to determine the greatest possible power of generator that can be installed in a diesel electric locomotive type TЭЗ using a diesel engine type 2А-100. In order that the generator may be accommodated in the locomotive frame its diameter cannot exceed 1 600 mm. This permits the use of an armature 1 200 mm in diameter. It is desired to know the maximum power of generator that can be designed within this diameter. The factors that limit the power are enumerated. It is concluded that the linear speed of the armature should not exceed 70 m/sec. It is supposed that the generator has no compensating winding and no damper winding, that long term 1.5 fold voltage forcing at constant power is required and that the generator is insulated with

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On the design of the most powerful possible generator for a diesel electric locomotive using single armature construction. (Cont.)

110-6-17/24

silicones capable of operating at a temperature of 180 °C. Equations are given for the solution of the problem and it is concluded that a 2 000 kW generator can be installed in a 3 000 h.p. locomotive. It would be desirable to operate the generator at a speed of 1 000 - 1 100 r.p.m. but unfortunately diesel engines type 2A -100 with outputs from 2 000 - 3 000 h.p. are designed for a speed of 850 r.p.m. The influence of different types of wave and lap winding is then considered, and the influence of other features on the possible output is discussed. If the engine speed could be increased to 1 000 r.p.m. the generator weight could be reduced by 9%. The metallurgical industry should master the production of cold rolled steel brand 3-310, 1 mm thick, which would permit of improved pole design. Improved types of brushholder and brush are also required. There is 1 figure.

Card 2/2

ASSOCIATION: KhETZ

SUBMITTED: January 16, 1957.

AVAILABLE:

SOV/110-58-11-26/28

AUTHOR: Lemberg, A.Ya. (Engineer)

TITLE: A Six-Layer Frog-Leg Winding for D.C. Machine (Shesti-sloynaya lyagushech'ya obmotka v mashinakh postoyannogo toka).

PERIODICAL: Vestnik Elektromyshlennosti, Nr.11, 1958, pp.76-77, (USSR)

ABSTRACT: Various types of three- and four-layer frog-leg windings have been described in the literature. This article briefly describes a six-layer frog-leg winding which incurs lower stray losses in the armature copper than a four-layer winding. The winding is a combination of lap and wave windings in which the section of the lap winding is 50% of the section of the wave winding, as indicated in Fig.1. The commutator pitches of the wave and lap winding are so chosen that the number of parallel paths is the same for each; hence the e.m.f. in each circuit is the same. A disadvantage of this type of winding is that the resistance offered to the equalising current is somewhat greater than in the other constructions, but as

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SOV/110-58-11-26/28

A Six-Layer Frog-Leg Winding for D.C. Machine.

the equalising current is in any case small this is not important. Tests with this type of winding were made on two 500-kW generators, one with six layers and one with four: the design data are stated. Calculations are made of the various losses in the generators and it is concluded that armature heating in the six-layer winding is about 90% of that occurring in a four-layer winding. This was confirmed experimentally; the four-layer winding armature had a temperature rise of 84°C and the six-layer winding 75°C. There are 2 figures and 3 Soviet references.

1. Armatures--Construction
2. Armatures--Temperature factors
3. Armatures--Test results

Card 2/2

LEMBERG H. YH

AUTHOR: Nikolayev, L.K., Engineer

110-1-18/19

TITLE: Discussion of the Article by A.Ya.Lemberg, Vestnik Elektropromyshlennosti, 1957, no.6 "On the Design of the Most Powerful Possible Generator for a Diesel-electric Locomotive Using Single-armature Construction" (O proyektirovanii moshchnogo predel'no ispol'zovannogo teplovoznogo generatora v odnoyakornom ispolnenii) (Po povodu stat'i A.Ya.Lemberga)

PERIODICAL: Vestnik Elektropromyshlennosti, 1958, Vol.29, no.1, pp. 78 - 79 (USSR).

ABSTRACT: This letter is rather critical of Lemberg's article. It doubts whether such a large machine should be made without a compensating winding and adduces reasons briefly.

SUBMITTED: August 20, 1957

AVAILABLE: Library of Congress
Card 1/1

SOV/110-59-4-8/23

AUTHORS: Lemberg, A.Ya., and Borushko, V.S. (Engineers)

TITLE: Selection of the Main Parameters of Traction Generators that are Rated as Highly as Possible (Vybor osnovnykh parametrov predel'no ispol'zovannykh tyagovykh generatorov)

PERIODICAL: Vestnik Elektromyshlennosti, 1959, Nr 4, pp 27-30 (USSR)

ABSTRACT: Recent interest in diesel electric traction for the railways has led to the development of many designs for locomotives with electric transmission. The article gives recommendations about selection of the main dimensions of generators, with good technical and economic characteristics, but which consume small amounts of raw materials. The technical requirements of traction generators are first stated. Traction generators are intended for continuous operation at rated load and it must be possible to adjust the voltage over a reasonable range, say by a factor of 1.5. Commutation should be such as to permit overload of 1.6 times rated load. It is assumed that there are no compensating windings, silicone insulation is used, cold-rolled steels are used in the main poles and low loss steels for the remainder of the magnetic circuit. A lap winding should be used and the mean voltage between

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SOV/110-59-4-8/23

Selection of the Main Parameters of Traction Generators that are Rated as Highly as Possible

the commutator segments can be 14 V. The linear load on the armature is about 500 A/cm. A formula is then given for the relationship between power and diameter and the relationship is also plotted in Fig 1. Other design data are derived. The economic characteristics of the generator are then considered. It is shown that the weight of the magnetic system depends only on the armature diameter and formulae are given for the weights of different parts of the magnetic circuit as function of armature diameter. Expressions are then given for the weight of the copper and finally a complete expression is derived for the relationship between the weight of the whole magnetic system and the armature diameter. In addition to giving formulae for the various relationships they are also plotted in Fig 2. Finally expression (29) is given for the relationship between the total weight of the generator and the output, and the corresponding curve is given in Fig 1. Formula (29) shows that the weight of the active materials in the optimum generator does not depend upon the speed of rotation. This means that with

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SOV/110-59-4-8/23

Selection of the Main Parameters of Traction Generators that are
Rated as Highly as Possible

the type of winding used a generator of any output up to
1320 kW can be made not only with the optimum armature
diameter given by expression (1) but also with a greater
diameter provided that the rotational speed is such that
the linear velocity does not exceed 70 m/sec. It is
concluded that the graphs given in the article can be
used to determine the generator weight and size
approximately.

Card 3/3 There are 2 figures.

SUBMITTED: November 5, 1958

LEMBERG, A.Ya., inzh.

Designing a traction generator. Vest.elektroprom. 31 no.6:66-68
Je '60. (MIRA 13:7)

(Electric generators)

LEMBERG, ABRAM YAKOVLEVICH, inzh.

Calculation of the optimum weakening of the field of the traction motor of a diesel locomotive. Izv. vys. ucheb. zav.; elektromekh. 4 no.5:44-49 '61.
(MIRA 14:7)

I. Khar'kovskiy zavod "Elektrotvornost'",
(Diesel locomotives,

LEMBERG, A.Ya., inzh.

Effect of the number of poles in d.c. machinery on the expenditure of
copper in the windings. Vest. elektroprom. 32 no.3:70-71 Mr '61.
(MIRA 15:6)

(Electric machinery--Windings)

LEMBERG, A.Ya., inzh.

Choice of the voltage range for electric traction generators.
Vest. elektroprom. 32 no.7:77-78 J1 '61. (MIRA 14:10)
(Diesel locomotives)
(Electric railway motors)

LEMBERG, A.Ya., inzh.

Accurate method for calculating nonbalanced e.m.f. of duplex
loop windings of d.c. machines. Vest. elektroprom. 34 no.5:
69-71 My '63. (MIRA 16:5)

(Electric machinery--Windings)
(Electric machinery--Direct current)

VASIL'YEV, V.A., inzh.; LEMBERG, A.Ya., inzh.

Problems of the design of the traction generators of diesel
locomotives. Elektrotehnika 34 no.11:35-39 N '63.
(MIRA 17:2)

LEMBERG, A. Ya., Eng.

Method for suppressing vibrations in the interlamella e.m.f.
curve. Elektrotehnika 36 no.665-6 1965.

(MIRA 18:7)

KAZAIMOV, V.M., LEMBERG, A.YE., Engineer

Loading and Unloading

Accelerating unloading of loose building materials from platform cars, Mekh.trud.rab. 6 no. 6, 1952.

Monthly List of Russian Accessions, Library of Congress, September 1952, Unclassified.

LENBERG, A.E.

Moscow. Cranes for multistory residential and municipal construction. Moskva, Gos. izd-vo lit-ry po stroitel'stvu i arkhitekture, 1953. 142 p. (54-42737)

Vsesoiuznyi nauchno-issledovatel'skii institut organizatsii i mekhanizatsii stroitel'stva. Krany dlia...1953. (Card 2, 54-42737)

LEMBERG, A YE

N/5
662.312
.V5

Zemleroynyye Mashiny (Earth Moving Machines)
Spravochnoye Posoye (By) A. M. Verzhitskiy i A. Ye
Lemberg. Moskva, Gosstroyizdat, 1954.

130 P. Diagrs., Tables.

At Head of Title: Moscow. Vsesoyuznyy Nauchno-Issledovatel'-
skiy Institut Organizatsii i Mekhanizatsii Stroitel'stva.

LEMBERG, A. Ye., inzhener

Device for automatically recording the work of tower cranes.
Mekh.stroi. 12 no.8:22-24 Ag'55. (MIRA 8:10)
(Cranes, darricks, etc.)

SMOL'SKAYA, A.Z.; LEMBERG, A.Ye.; KUCHEROV, A.I., inzhener, nauchnyy redaktor;
BEGAK, B.A., redaktor izdatel'stva; GUSEVA, S.S., tekhnicheskii
redaktor

[Assembling precast reinforced concrete apartment houses and industrial
buildings; design and construction in the U.S.S.R. and in foreign
countries] Montazh sbornyykh zhelezobetonnykh konstruktsei zhilykh i
promyshlennykh zdaniy; opyt proektirovaniya i stroitel'stva v SSSR i
za rubezhom. Moskva, Gos. izd-vo lit-ry po stroit. i arkhitekture,
1956. 117 p. (MLRA 10:1)
(Precast concrete construction)

LEMBERG, A.Ye., inzhener.

Types and parameters of cranes used in building of multistory
apartment houses made of precast reinforced concrete elements.
Mekh.stroi.13 no.11:16-20 N '56. (MLRA 9:12)
(Cranes, derricks, etc.) (Precast concrete construction)

LEMBERG, A.Ye.; SMOL'SKAYA, A.Z.; KUCHEROV, A.I., inzhener, nauchnyy
redaktor; BEGAK, B.A., redaktor izdatel'stva; GUSEVA, S.S.,
tekhnicheskiiy redaktor

[Cranes for erecting buildings of precast concrete elements] Krany
dlya montazha zdaniy iz sbornyykh zhelezobetonnykh elementov. Moskva,
Gos. izd-vo lit-ry po stroit. i arkhitekt., 1957. 191 p. (MLRA 10:9)
(Precast concrete construction)
(Cranes, derricks, etc.)

VERZHITSKIY, A.M., inzh.; LEMBERG, A.Ye., inzh.; TROITSKIY, Kh.L.,
kand. tekhn.nauk, nauchnyy red.; KARDO-SYSOYEV, F.N.,
red. izd-va; SMOL'YAKOVA, M.V., tekhn. red.

[Earthworking machinery] Zemleroinye mashiny; spravochnoe
posobie. Moskva, Gos.izd-vo lit-ry po stroit. i arkhit.,
1954. 130 p. (MIRA 16:6)
(Earthmoving machinery) (Boring machinery)

FETISOV, V.V., kand. tekhn. nauk; LEMBERG, A.Ya., inzh.

Choice of the parameters of three-way singularly short-circuited
loop windings of d.c. machines. Elektrotehnika 35 no. 11:59-63
N '64. (MIRA 18:6)

LEMBERG, B.

Strengthening jib heads of E-255 and E-353 excavators. Na stroi.
Mosk. 2 no.9:25 S '59. (MIRA 13:2)

1. Nachal'nik uchastka upravleniya mekhanizatsii No.22 tresta
Mosstroymekhanizatsiya No.7.
(Excavating machinery)

LEYTES, S.M., prof.; LEMBERT, B.L.

Affect of stress on some indices of lipid metabolism in alimentary
loading with fat and cholesterol. Vop.med.khim. 11 no.6:25-29 M.D
1964.
(MIR: 18:12)

3. Kafedra patofiziologii i Sentral'nogo instituta usovershenstvovaniya
vrashey, Moskva. Submitted June 20, 1964.

LEMBERG, E.

The representative in the grievance committee. Sots.trud. no.4:
106-107 Ap '56. (MLRA 9:11)

(Grievance procedures)

LEMBERG, I. KH.

USSR/Nuclear Physics - Gamma Quanta Jul/Aug 53

"Angular Correlation of Gamma Quanta of Ni^{60} , Ba^{134} , Cd^{114} and Ti^{48} ," D. G. Alkhazov, I. Kh. Lemberg and A. P. Grinberg, Phys Tech Inst, Acad Sci USSR

Iz Ak Nauk, Ser Fiz, Vol 17, No 4, pp 487-502

As a method of indirect information on nuclear spins in excited states, the authors applied the measurement of angular correlation of quanta or particles released in cascade. They investigated gamma-gamma correlation between direction

272T48

of propagation of 2 gamma quanta emitted consecutively by one nucleus. Results confirmed assumption that the spin of first excited level of even-even nucleus equals 2. Rec 16 Jul 53.

LEMBERG, I. KH.

USSR.

Masses of scandium⁴⁵ and of zirconium⁹⁰. V. A. Kravtsov and I. Kh. Lemberg (Leningrad Polytech. and Phys. Tech. Inst.). *Zhur. Eksp. i Teor. Fiz.* 25, 628-30 (1953).—The nuclear structures and radioactive decay products of Sc⁴⁵ and Ti⁴⁶ are discussed. K. and L. conclude that the at. masses are: Ti⁴⁶ = 47.96319 ± 0.00004 and Sc⁴⁵ = 47.90741 ± 0.00009. Masses of chlorine³⁵ and of argon³⁶. V. A. Kravtsov. *Ibid.* 25, 630-2 (1953).—The most probable values, on the basis of the mass of K³⁹ and β -decay schemes, are: Cl³⁵ = 38.98016 ± 0.00007; and Ar³⁶ = 38.97600 ± 0.00004 at. mass units. F. H. R. 62 ①

LENBERG, I. Kh.

1 RML

✓ Investigation of several cases of angular correlation.
 A. P. Grigberg and I. Kh. Lemberg (Phys. Tech. Inst.,
 Leningrad). *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.* 19,
 309-7 (1956).—The anisotropy of β - γ angular correlation
 $W(\theta)$ of the transition $Sb^{120} \rightarrow Te^{120}$ for $E \approx 2.2$ m.e.v. (limit
 of the β -spectrum) has been experimentally detd. with a
 magnetic spectrometer. A β - and a γ -coincidence counter
 consisting of a stilbene crystal and a photomultiplier was
 used. The results can be represented by $W(\theta) = 1 + s$
 $\cos^2\theta$, with $s = -0.438 \pm 0.027$. This does not correspond
 to calcd. values. With NaI(Tl) crystals the angular cor-
 relation of γ -quanta of $Ti D$ was also detd. The angular
 correlation corresponds to spin values of the levels equal to
 4, 2, 0, and to quadrupole transitions. By means of
 measurements of angular correlation it was shown that in
 the transition $Zr^{90} \rightarrow Nb^{90}$ to the excited level of Nb^{90} , the
 following transition to the ground level occurs directly and
 not in several steps. S. Fakhar

① 10/12/56

LEMBERG, I. Kh.

ALKHAZOV, D.G.; ANDEYEV, D.S.; GRINBERG, A.P. ~~and~~ LEMBERG, I. Kh.

Study of the Coulomb excitation of nuclei by means of nitrogen ions.
Izv. AN SSSR, Ser. fiz. 20 no. 12: 1365-1376 D '56. (MLRA 10:3)

1. Leningradskiy fiziko-tekhnicheskii institut Akademii nauk SSSR.
(Nuclei, Atomic) (Spectrum, Atomic)

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1227
 AUTHOR GRINBERG, A.P., LEMBERG, I.~~HH~~.
 TITLE On COULOMB'S Interaction of Nuclei with Heavy Ions.
 PERIODICAL Zhurn. eksp. i teor. fis, 30, 807-808 (1956)
 Publ. 4 / 1956 reviewed 8 / 1956

The energy of the bombarding particle may be considerably increased also without excitation of nuclear reactions for COULOMB'S excitation if accelerated heavy ions are used instead of protons or α -particles. Here the cross section σ_h of the COULOMB excitation of a nucleus by heavy ions is estimated.

Instead of σ_h it is easier to compute (σ_h/σ_p) as a function of $\xi_p = 0,1575 z_1 z_2 \sqrt{\mu_p} \cdot ((E_p - \Delta E)^{-1/2} - E_p^{-1/2})$. Here the index p refers to protons, and z_1 and z_2 denote the number of protons in the bombarding nucleus, i.e. in the target nucleus, μ_p is the mass of the proton expressed in nuclear units of measure. The index h refers to the heavy bombarding particle. We find $\sigma_h/\sigma_p = \mu_h (E_h - \Delta E) f_2(\xi_T) / \mu_p (E_p - \Delta E) f_2(\xi_p)$, and from the corresponding diagram the following conclusions may be drawn: σ_h/σ_p decreases with diminishing E_p , and, if k is given it is largest with $\xi_p \rightarrow 0$, i.e. if E_p is large, and at $0 < \xi_p < 1$ it is considerably larger than 1; the values of σ_h/σ_p increase with growing k and particularly with $\xi_p \rightarrow 0$.

Žurn.eksp.i teor.fis. 30, 807-808 (1956) CARD 2 / 2

PA - 1227

In medium-sized cyclotrons it is possible to accelerate nitrogen ions with a treble charge from 10 to 30 MeV. On the occasion of the excitation of the first and second excited levels of Ta^{181} the values 75 and 50 respectively are found for σ_h/σ_p . On the occasion of the experimental investigation of

COULOMB interaction thick targets are frequently used in order to obtain an increased yield of γ -quanta. For the ratio of the yields of γ -radiation as a result of COULOMB excitation it applies that

$$Q_h Q_p = \int_{E_h}^0 \sigma_h(E) dE / (dE/dx)_h / \int_{E_p}^0 \sigma_p(E) dE / (dE/dx)_p, \text{ if an equal number of}$$

protons and heavy ions impinges upon the target. On the occasion of the excitation of the first level of the Ta^{181} nucleus by nitrogen ions with $E_h=14,5$ MeV this formula results in $Q_h/Q_p=12$. Thus, though Q_h/Q_p is considerably smaller

than σ_h/σ_p if thick targets are used, it nevertheless remains larger than 1.

On the occasion of the passing of charged particles through matter a characteristic X-ray radiation occurs, and in some cases the energy of the X-ray K quanta is near the energy of the γ -quanta emitted by COULOMB'S excitation. In the case of thick Ta-targets the ratio (number of X-ray γ -quanta occurring as a result of the ionization of tantalum atoms by inciding particles/ number of 137 keV γ -quanta occurring on the occasion of the employment of nitrogen ions with 15,6 MeV) is 15 times as great as in the case of the employment of 2,1 MeV protons.

INSTITUTION: Leningrad Physical-Technical Institution of the Academy of Science in the USSR.

✓4067

EXPERIMENTAL STUDY OF COULOMB EXCITATION OF
NUCLEI BY NITROGEN IONS. D. G. Alkhalov, D. S.

Howe Andreev, A. P. Grinberg, and I. Kh. Lemberg (Academy of
Sid Sciences, USSR). Soviet Phys. JETP 3, 964-8(1957) Jan.

An experimental investigation was made of the Coulomb
excitation of the nuclei of 21 elements by nitrogen ions.
The nitrogen ions were accelerated in a cyclotron to 15.8
Mev. The targets were pressed into the bottom of an iso-
lated metallic vessel which served as a Faraday cup. Re-
sultant data are summarized in both graphical and tabular
form. (B.J.H.)

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LEMBERG, I. Kh.

AUTHOR: Alkhazov, D.G., Gangrskiy, Yu.P., Lemberg, I.Kh. 56-5-14/46
 TITLE: Nuclear Reactions of N^{14} Ions With Li^7 and C^{12} (Yadernyye reaktsii ionov N^{14} s Li^7 i C^{12})
 PERIODICAL: Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol. 33, Nr 5, pp. 1160-1162 (USSR)
 ABSTRACT: N^{14} ions are accelerated up to 15,6 MeV in a cyclotron, after which they are ejected as N^{++} -ions, and, focused by quadrupole lenses, impinge upon targets of Li^7 and C^{12} . The yields of reaction products with a half life which is larger than 1 sec., are measured as follows:

$Li^7 + N^{14} \rightarrow F^{18}$	in mb
$Li^7 + N^{14} \rightarrow Ne^{19}$	18
$Li^7 + N^{14} \rightarrow N^{16}$	4,0
$Li^7 + N^{14} \rightarrow O^{15}$	15
$C^{12} + N^{14} \rightarrow Al^{25}$	1,3
	0,2

Card 1/2 If the forming cross section of F^{18} is compared in reactions

56-5-14/46

Nuclear Reactions Of N^{14} Ions With Li^7 and C^{12}

with the α -binding energy of the target nuclei when various light nuclei are bombarded with N-ions, it may be said that F^{18} is formed by the fact that the N-particle flying past the target nucleus, carried along a α -particle from this target nucleus. There are 2 tables and 7 non-Slavic references.

ASSOCIATION: Leningrad Institute of Technical Physics AN USSR (Leningradskiy fiziko-tekhnicheskii institut SSSR)

SUBMITTED: June 3, 1957

AVAILABLE: Library of Congress

Card 2/2

LEMBERG, I. Kh.

AUTHORS: Alkhazov, D. G., Andreyev, D. S.,
Yerokhina, K. I., Lemberg, I. Kh.

56-6-6/47

TITLE: The Coulomb Excitation of Separated Tin Isotopes
(Kulonovskoye возбуждениye razdelennykh izotopov
olova).

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1957,
Vol. 33, Nr 6, pp. 1347-1358 (USSR)

ABSTRACT: A 14,5 MeV α -beam coming from a cyclotron is focused
by a system of quadrupol lenses in an aluminum tube and
thus impinges upon a target, where Coulomb excitation takes
place. The γ -quanta liberated on this occasion are
measured in a well screened γ -scintillation spectrometer.
Between the crystal and the target the following γ -absorbers
are connected:

400 μ Cu; 1.3 mm Al; 100 μ mica; 1 mm MgO; 50 μ Pb
and 1.5 mm air.
The following measuring and computation results were
obtained:

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The Coulomb Excitation of Separated Tin Isotopes

56-6-6/47

isotope	ΔE in MeV ^x)	$\frac{B(E2)}{e^2} \cdot 10^4$ in cm ⁴	$\tau \cdot 10^{13}$ in sec.
Sn ¹¹²	1,26	0,18	7,2
Sn ¹¹⁴	1,30	0,20	5,5
Sn ¹¹⁶	1,29	0,19	6,0
Sn ¹¹⁸	1,22	0,19	8,0
Sn ¹²⁰	1,18	0,17	10,5
Sn ¹²²	1,15	0,15	13,5
Sn ¹²⁴	1,13	0,14	15,9
Sn ¹¹⁵	-xx)	-	-
Sn ¹¹⁷	(0,865 1,03	(0,025 0,09	-
Sn ¹¹⁹	0,907	0,11	-

Card 2/3

The Coulomb Excitation of Separated Tin Isotopes

56-6-6/47

x) Corresponds to the energy of the γ -quantum which goes directly to the basic state.

xx) Between 0,75 up to 1,75 MeV no γ -quanta were found.

There are 7 figures, 1 table, and 19 references, 4 of which are Slavic.

ASSOCIATION: Leningrad Physico-Technical Institute AN USSR
(Leningradskiy fiziko-tehnicheskii institut Akademii nauk SSSR).

SUBMITTED: June 3, 1957 (initially) and October 5, 1957 (after revision)

AVAILABLE: Library of Congress

Card 3/3

24(3)
 AUTHORS: Alkhazov, D. G., Grinberg, A. P., Guginskiy, G. M.,
 Yerokhina, K. I., Lemberg, I. Kh. SOV/56-35-4-46/52

TITLE: The Coulomb Excitation of Aluminum (Kulonovskoye vozvuzhdeniye
 alyuminiya)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958,
 Vol 35, Nr 4, pp 1055-1056 (USSR)

ABSTRACT: The authors investigated the Coulomb (Kulon) excitation of
 Al^{27} -nuclei by means of heavy ions which were accelerated
 in a cyclotron. The ions concerned were 15.9 MeV triple-
 charged nitrogen ions and triple-charged 18.1 MeV oxygen ions.
 The γ -radiation occurring during the bombardment of the alu-
 minum was investigated by means of a scintillation- γ -spectro-
 meter with a NaJ(Tl crystal. The investigation method employed
 and calculation of the values $B(E2)^\uparrow$, i.e. of the reduced
 probability of a quadrupole transition of a nucleus from the
 ground state to an excited state has already been described
 in earlier papers. A diagram shows the γ -radiation spectrum
 which was produced by a Coulomb excitation of aluminum by

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The Coulomb Excitation of Aluminum

SOV/56-35-4-46/52

nitrogen ions. Two lines with $E = 0.84$ and with 1.01 MeV respectively are observed. The relative intensity of the γ -cascade transition $0.84 + 0.17$ MeV amounts to not more than 4% of the direct transition to the ground level. An attempt to excite the two aforementioned Al^{27} levels by means of nitrogen ions (which were accelerated to 25 MeV) was without success because of the sharp increase of the γ -radiation background (which is due to nuclear reactions). The results obtained when using nitrogen- and oxygen-ions agree well with one another. The values of $B(E2)$ for the levels with $\Delta E = 0.84$ and 1.01 MeV amount to 0.0019 and $0.0031 e^2 \cdot 10^{-48} cm^4$ respectively. The partial lives of the levels with $\Delta E = 1.01$ MeV and $\Delta E = 0.84$ MeV amount to $1.7 \cdot 10^{-11}$ sec and $3.7 \cdot 10^{-11}$ sec respectively. There are 1 figure and 6 references, 2 of which are Soviet.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskii institut Akademii nauk SSSR (Leningrad Physico-Technical Institute of the Academy of Sciences USSR)

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21(8)

SOV/56-35-4-47/52

AUTHORS:

Alkhozov, D. G., Grinberg, A. P., Gusinskiy, G. M.,
Yerokhina, K. I., Lemberg, I. Kh.

TITLE:

The ~~Lifetime~~ of the First Excited Level of Mg^{24} (Vremya zhizni
pervogo vozbuzhden'nogo urovnya Mg^{24})

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958,
Vol 35, Nr 4, pp 1056-1058 (USSR)

ABSTRACT:

The investigation of the Coulomb (Kulon) excitation of the
nuclear level makes it possible to calculate its life. For
the transition of even-even nuclei from the ground state
with spin 0 to the first excited level with spin 2 it holds
that

$$1/\tau = 2.46 \cdot 10^{-3} (\Delta E)^5 B(E2)^{\uparrow}.$$

Here ΔE denotes the level energy in keV, and $B(E2)^{\uparrow}$ the
reduced probability of the aforementioned transition. Here
 $e^2 \cdot 10^{-48} \text{ cm}^4$ serves as a measuring unit of $B(E2)$. In the
present paper triple-charged nitrogen- and oxygen ions with
energies of 15.9 and 18.1 MeV respectively, and also quadruple-
charged nitrogen ions with 25.6 and 36 MeV are used. Investi-

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The ^{the} Lifetime of/ First Excited Level of Mg^{24}

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gations are rendered difficult by a permanent parasitic line of 1.37 MeV (which is thus in agreement with the line under investigation). A diagram shows the spectrum obtained by the bombardment of natural magnesium with 15.9 MeV nitrogen ions. According to estimates made by the authors, the maximum error committed when determining the area of the parasitic peak amounts to not more than $\pm 5\%$ of the peak under investigation. The mean value of $B(E2)^\uparrow$, which was determined by 6 different experiments, amounts to $0.054 e^2 \cdot 10^{-48} \text{ cm}^2$, from which it follows that $\tau = (1.5 \pm 0.4) \cdot 10^{-12} \text{ sec}$. In conclusion, a short report is given on results obtained by other authors. There are 1 figure and 3 references, 2 of which are Soviet.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskii institut Akademii nauk SSSR
(Leningrad Physico-Technical Institute of the Academy of Sciences USSR)

SUBMITTED: July 9, 1958

Card 2/2

24(5)

AUTHORS:

SOV/56-35-6-2/44
Alkhazov, D. G., Grinberg, A. P., Gusinskiy, G. M., Yerokhina, K.I.,
Lemberg, I. Kh.

TITLE:

Coulomb Excitation of High-Energy Nuclear Levels in Even Tungsten
Isotopes (Kulonovskoye vozvuzhdeniye yadernykh urovney s bol'shoy
energiiyey v chetnykh izotopakh vol'frama)

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35,
Nr 6, pp 1325-1334 (USSR)

ABSTRACT:

In their introduction the authors deal in detail with investigations
carried out in this field by other authors (Refs 1-3, 6-11). The
authors themselves already determined even-even nuclei with 15 Mev
 α -particles and excited states with energies of up to 1.5 Mev
(Refs 4,5). Peker (Ref 11) set up schemes of excited levels on the
basis of a generalized nuclear model for W^{184} and W^{186} according
to data obtained from references 9 and 10. Herefrom it follows
that the levels of W^{184} with $\Delta E = 900$ kev and that of W^{186} with
 $\Delta E = 750$ kev are vibration levels (2^+). In the present paper the
authors used the following energies for their investigations for
the excitation of α -particles: 8.3, 10.2, 13.1 and 14.5 Mev. The
particles were accelerated in a cyclotron. The target substance

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SOV/56-35-6-2/44

Coulomb Excitation of High-Energy Nuclear Levels in Even Tungsten Isotopes

consisted of natural tungsten and of samples (lead bases) which were enriched with W^{182} , W^{184} , and W^{186} . The results obtained by the investigations are shown by a number of diagrams and tables. Figure 1 shows the spectrum emitted by natural tungsten at Coulomb excitations ($E_{\alpha} = 14.5$ Mev), and figure 2 shows the same for the last high-energy lines. The extrema of the curves correspond to the following lines: 511, 610, 730, 900, 1120, and 1220 kev. The line $\Delta E = 790$ kev does not occur here, but the γ -spectrum for W^{184} ($E_{\alpha} = 13.1$ Mev) shows weak but distinct maxima for $\Delta E = 790$ and 900 kev; figure 4 shows the same for W^{186} ($E_{\alpha} = 14.5$ Mev) 511 kev (intensive line), 610 and 730 (weak lines). The existence of the following excited levels was determined: W^{182} : 1.22 Mev, W^{184} : 0.90 Mev, W^{186} : 0.73 Mev. The reduced transition probabilities to the ground state $B(E2)$ calculated for each of these levels were found to be 0.051, 0.038 and 0.040 respectively (in units of $e^2 \cdot 10^{-48} \text{ cm}^4$). The assumption that these levels belong to the vibration type is discussed. The author finally thanks B.L. Birbrair,

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Coulomb Excitation of High-Energy Nuclear Levels in Even Tungsten Isotopes SOV/56-35-6-2/44

L. K. Peker, and L. A. Sliv for discussing results.- There are 5 figures, 2 tables, and 15 references, 5 of which are Soviet.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskii institut Akademii nauk SSSR
(Leningrad Physico-Technical Institute of the Academy of Sciences, USSR)

SUBMITTED: May 26, 1958

Card 3/3

LEMBERG, I-Kh.

NOPIZ, Ye. V.

AUTHOR: Varshalovich, D.

51/2-8-59-55/A05

The VIII Annual Congress of Nuclear Spectroscopy (VIII
yezhegodnoye s'ezhcheniye po yadernoy spektroskopii). I

PHYSIOLOGICAL:

Uspekhi fizicheskikh nauk, 1958, Vol. 65, Nr 4,
pp. 721 - 722 (USSR)

ABSTRACT

The 8th Congress of Nuclear Spectroscopy took place in Leningrad from January 27 to February 3, 1958. It was attended by 300 scientists from the USSR, further by scientists from China, France, Poland, Czechoslovakia, Hungary, Eastern Germany, Yugoslavia, and the Mongol Democratic Republic. The main lectures and about 90 reports were heard. The main lectures dealt with problems concerning nuclear models, the α - and β -decay, γ -radiation, internal conversion, and nuclear isomerism. S. S. Dzhalepov, Corresponding Member, Academy of Sciences, USSR, opened the conference. Lectures were held by: V. G. Gonchar, Ye. V. Zolotarev, S. P. Pavlov (VPI AS USSR) on light nuclei and generalized nuclei models; K. K. Feyer (IAS, Princeton) on β -decay; Yu. M. Shirokov (MGU-Moscow State University) on β -decay; L. A. Gliv (LPI-Leningrad Physical-Technical Institute) on α levels in Mg^{24} , Mg^{25} , and Al^{27} , etc.

[illegible]

(AN SSSR) gave a survey report "Concerning Some Particulars in Vibrational Levels of Deformed Nuclei". The authors are well-known also by D. Zaretskiy (AN SSSR - AS USSR), who has studied transitions in deformed nuclei with spin $1/2$. Transition probabilities were calculated for the β^- -transitions from the first excited state of odd nucleons to the ground state of even nucleons. The calculations were carried out for the nucleus ^{187}Os , which was chosen as an example. The results obtained show that the probability of corresponding β^- and β^+ transitions increases with increasing deformation of the nucleus. This increase is due to the influence of the spin-orbit coupling upon the magnetic moments of the nuclei. A. I. Bas (AN SSSR - AS USSR) on the existence of light nuclei with high neutron or proton excess). A. Kravtsov (Leningrad Polytechnic Institute) on the formation of nucleon pairs in nuclei. L. G. Gol'din, A. V. Kiselev, G. M. Sorokina, E. A. Tar-Matrasovyan (Vol' AN SSSR).

[illegible]

21(7)

SOV/48-23-2-11/20

AUTHORS:

Alkhazov, D. G., Grinberg, A. P., Yerokhina, K. I., Lemberg, I. Kh.

TITLE:

Coulomb Excitation of Nuclear Levels in Spherical Even-even Nuclei (Kulonovskoye возбуждениe yadernykh urovney v sfericheskikh chetno-chetnykh yadrakh)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 2, pp 223-224 (USSR)

ABSTRACT:

The present paper contains results obtained in the investigation of Coulomb excitation of the first level of Si, Ti, Cr; Fe, Ni and Zr isotopes. The targets enriched with such isotopes were bombarded with triple- and quadruple-charged nitrogen ions which had been accelerated to 15.9-35 Mev in the cyclotron. The experimental procedure was given in a previous paper (Refs 1, 2). The authors calculated the stopping power dE/dx of the investigated elements for N by recalculating the range-energy curves for α -particles according to Longchamp (Ref 3). The stopping power was also determined from the range-energy curve for N ions in Ni according to data on investigation of stopping power in Ni. The measurement results are listed in a table which also contains the probability of transitions and the life-time τ of the excited states as determined by the method of Coulomb excitation. In paper (Ref 8)

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Coulomb Excitation of Nuclear Levels in Spherical Even-even Nuclei

the authors assumed a systematic increase of value τ determined by Coulomb method with respect to the values τ determined by resonance scattering. This assumption does not agree with the results obtained here. There are 1 table and 9 references, 3 of which are Soviet.

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24 (5), 21 (7)

AUTHORS:

Grinberg, A. P., Lemberg, I. Kh.

SOV/48-23-7-22/31

TITLE:

Specific Losses of Energy in the Stopping of Heavy Ions in Different Substances (Udel'nyye poteri energii pri tormozhenii tyazhelykh ionov v razlichnykh veshchestvakh)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 7, pp 887-893 (USSR)

ABSTRACT:

In the investigation of Coulomb excitations of the nuclei, life times of the excited levels of the nuclei in the range of 10^{-12} seconds and less are determined. In using positrons and α -particles, this is only possible for such nuclei the nuclear-charge number of which is higher than 50. Heavy ions must be used to reduce the influence of the γ -background of the nuclear reactions for nuclei with nuclear-charge numbers under 50. In this case, it is necessary for the calculation of life times of excited levels to know the specific losses of energy in the stopping of the ions of C, N, etc in different substances. As the known data are considered inaccurate, experiments were carried out with ions of the isotopes N^{14} , C^{12} , O^{16} and $Ne^{20,22}$ on the cyclotron of the Laboratory of the FTI for determining the

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Specific Losses of Energy in the Stopping of Heavy
Ions in Different Substances

SOV/48-23-7-22/31

Coulomb excitation of the nuclei of heavy ions. Three methods are indicated for calculating the amount of the specific loss of energy. The first method was developed by Longchamp. It is based on a number of theoretical investigations, and the mean charge is calculated by means of the statistical atom model by Thomas-Fermi. The second method is called the proton method; it is based on the known formula by Bethe-Bloch. The third method is the method of the mean ion charge. Here, the influence of the monovalent ions is neglected. In figure 1, the curve found experimentally for the range-energy of ions of the isotope N^{14} in stopping in nickel is compared with the curve calculated by the method of Longchamp. In figure 2, the specific loss of energy experimentally determined for the ions of the same isotope is compared with the specific losses calculated according to Longchamp and by the third method. A good agreement is to be seen in the first diagram, sometimes considerable deviations are to be seen in the second diagram. Besides, three diagrams representing the mean values of the specific energy loss of the ions of the isotopes N^{14} , C^{12} and O^{16} in the energy

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Specific Losses of Energy in the Stopping of Heavy
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interval of 15-25 Mev in dependence on the nuclear-charge number of the stopping media, are shown. Finally, the specific energy loss of the ions of Ne^{20} is investigated, and it is ascertained that, on account of the extensive experimental results, the calculation of the life of the Coulomb-excited states does not show a big error. There are 6 figures and 9 references, 2 of which are Soviet.

ASSOCIATION:

Fiziko-tekhnicheskiy institut Akademii nauk SSSR
(Physico-technical Institute of the Academy of Sciences, USSR)

Card 3/3

85861

S/048/59/023/012/005/009
B006/B060

24.6520
AUTHORS:

Alkhazov, D. G., Grinberg, A. P., Gusinskiy, G. M.,
Lemberg, I. Kh.

TITLE:

Nuclear Reactions of Multicharged Ions With Carbon and
Oxygen, and Their Influence on the Investigation of the
Coulomb Excitation of Nuclear Levels

PERIODICAL:

¹⁹
Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959,
Vol. 23, No. 12, pp. 1465 - 1472

TEXT: The investigation of the ion induced excitation of high-energy nuclear levels encounters great difficulties due to intensive γ -background. The attempt of exciting high-energy nuclear tin levels by nitrogen ions (25 Mev) revealed a γ -background exceeding considerably the expected γ -emission due to Coulomb excitation. In order to clarify origin and background character, the authors investigated γ -spectra of different elements, of their compounds and of isotopes occurring with their bombardment by C^{12-} , N^{14-} , O^{16-} , Ne^{20-} , and Ne^{22-} ions. The γ -recording was carried out by

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Nuclear Reactions of Multicharged Ions With : 85861
Carbon and Oxygen, and Their Influence on the S/048/59/023/012/005/009
Investigation of the Coulomb Excitation of Nuclear Levels B006/B060

means of a scintillation spectrometer joined with a multiplier (FEU-11),
and a fifty-channel pulse analyzer. The distance between target and the
front of the NaJ(Tl)-crystal was 2.7 mm. The 0.1 - 2 Mev region of the
 γ -spectra was investigated, and the background was determined for the
following bombarding ion energies: C^{12} (13.6 Mev), N^{14} (11-40 Mev),
 O^{16} (18.1 Mev), Ne^{20} (23.1 - 27.8 Mev), and Ne^{22} (25.8 Mev). The ions were
accelerated in the cyclotron of LFTI (Leningrad Physicotechnical
Institute). The most accurate γ -background spectrum investigation was
conducted with the bombardment with nitrogen ions, proceeding from
 $E_N = 15.9$ Mev. In Fig. 1 the γ -spectra of a graphite and a nickel target
are given; they are very similar. The γ -background lines 0.35, 0.51 (very
weak), 0.59, and 1.37 Mev were observed. For $E_N = 11.25$ Mev the above two
first lines were no more observable (for graphite), the two last ones were
weaker, and the continuous background diminished. An increase in E_N caused
intensification. For silicon bombardment with $E_N = 25$ Mev the background

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Nuclear Reactions of Multicharged Ions With S/048/59/023/012/005/009
Carbon and Oxygen, and Their Influence on the B006/B060
Investigation of the Coulomb Excitation of Nuclear Levels

line 1.63 Mev, for aluminum bombardment the lines 0.69 and 0.81 Mev were observed. Fig. 2 shows the γ -spectrum with Ni⁶² bombardment by N⁴⁺ (35 Mev). Fig. 3 applies to the same for vanadium bombardment. In both spectra the 1.37 Mev background line is missing, nickel exhibits the intensive 1.19 Mev line, vanadium a 0.92 Mev line. The results are discussed and some further ones are given. For targets containing oxygen the background lines 0.51 and 1.78 Mev as well as increased intensity of the 0.59 and 1.37 Mev were observed under bombardment with nitrogen ions. When E_N is increased from 15 to 40 Mev the intensity of the 1.78 Mev line increases much faster than that of the 1.37 Mev line. Next, results of γ -background investigations when bombarding with other ions are given: ✓

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Nuclear Reactions of Multicharged Ions With S/048/59/023/012/005/009
Carbon and Oxygen, and Their Influence on the B006/B060
Investigation of the Coulomb Excitation of Nuclear Levels

	E _γ (Mev) for reaction with	
	Carbon	Oxygen
C ¹² (13.6 Mev)	0.44, 0.51, 1.63;	0.51, ~1.0, 1.37
N ¹⁴ (15.9-40 Mev)	0.35, 0.51, 0.59, 1.37;	0.51, 0.59, ~1, 1.37, 1.78
O ¹⁶ (18.1 Mev)	0.51, 1.37	---
Ne ²⁰ (23.1 Mev)	---	0.69
Ne ²² (25.8 Mev)	---	---

Full particulars are given of the results; the attempt is further made of explaining the various occurring lines by reactions between ion and bombarded nucleus. For example: γ -background line 1.63 Mev:

C + C = Ne²⁰ + α + 11.4 Mev (the first Ne²⁰ level has the energy of 1.63 Mev). 1.37 Mev: N + C = Mg²⁴ + α , or N + C = Na²⁴ + 2p, where Na²⁴ decays to the first excited Mg²⁴ level by β -decay ($\Delta E = 1.37$ Mev).

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Nuclear Reactions of Multicharged Ions With S/048/59/023/012/005/009
Carbon and Oxygen, and Their Influence on the B006/B060
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0.35 Mev: $N + C = Ne^{21} + \alpha + p$. 0.59 Mev: $N + C = Na^{22} + \alpha$. Some lines may be explained by different reactions as for instance: 1.78 Mev:
 $N + O = Al^{28} + 2p$; $N + O = Si^{28} + n + p$; $N + O = P^{28} + 2n$. Finally the investigation possibilities of Coulomb excitation of nuclear levels are discussed for different experimental conditions. A team under the supervision of A. B. Girshin participated in this work. There are 3 figures, 1 table, and 10 references: 8 Soviet.

✓

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21(8)

AUTHORS: Alkhazov, D. G., Grinberg, A. P., SOV/56-36-1-50/62
Lemberg, I. Kh., Rozhdestvenskiy, V. V.

TITLE: The Coulomb Excitation of Neon (Kulonovskoye возбуждениye neona)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959,
Vol 36, Nr 1, pp 322-324 (USSR)

ABSTRACT: Such an excitation of levels can be observed not only in the target nucleus but also in the bombarding nucleus, if the latter has a sufficiently high excitation cross section. In the case of most of the work hitherto carried out in connection with Coulomb (Kulon) excitation the targets were bombarded with protons or α -particles. As, however, the nuclei H^1 and H^4 have no suitable levels, the above mentioned phenomenon has hitherto not been observed. However, if heavy ions are used in some cases, an excitation of the nuclear levels may be found in the bombarding particles. The authors investigated the Coulomb excitation of the nuclei Ne^{20} and Ne^{22} , in which case the neon nuclei were accelerated. The energy of the first excited levels of these nuclei

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The Coulomb Excitation of Neon

SOV/56-36-1-50/62

amounts to 1.63 and 1.275 Mev. The cyclotron was adjusted to the acceleration of one or the other ions by variation of the magnetic field strength with unvaried frequency of the accelerating cyclotron field. As targets Be, B, C, Mg, Al, Si, $Mg^{24}O$, $Mg^{25}O$, $Mg^{26}O$, and ScO were used. According to the authors' calculations the yield of the γ -radiation connected with the Coulomb excitation of Ne^{20} or Ne^{22} must decrease considerably with an increase of the atomic number of the target nuclei. Therefore, only targets with light nuclei were used for the here discussed experiments. The γ -radiation produced by bombarding various targets with neon-ions was recorded by means of a γ -spectrometer with $NaJ(Tl)$ -crystal. Two diagrams show the spectra of γ -rays which were emitted in the case of the Coulomb excitation of the level $\Delta E = 1.63$ Mev (and $\Delta E = 1.275$ Mev respectively) during the bombardment of aluminum with Ne^{20} -ions (or by Ne^{22} -ions respectively). Similar spectra, which indicate excitation of the aforementioned neon nuclei, were found also in connection with the bombarding of the remaining nuclei, with the

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The Coulomb Excitation of Neon

SOV/56-36-1-50/62

exception of boron and beryllium. In these two exceptional cases the peak with $E = 1.63$ Mev was not observed during the bombardment with Ne^{20} -ions because of the very strong γ -background. In the case of a bombardment of these targets with Ne^{22} -ions a distinctly marked peak with $E = 1.275$ Mev is observed. The mean values of $B(E2)$ are $0.041 \text{ e}^2 \cdot 10^{-48} \text{ cm}^4$ for the level with $\Delta E = 1.63$ Mev of Ne^{20} and $0.025 \text{ e}^2 \cdot 10^{-48} \text{ cm}^4$ for the level with $\Delta E = 1.275$ Mev of Ne^{22} . The mean life τ of these states amounts to $8.6 \cdot 10^{-13} \text{ sec}$ and $4.8 \cdot 10^{-13} \text{ sec}$ respectively. The authors thank the head of the working group A. B. Girshin, who was responsible for the undisturbed operation of the cyclotron. There are 2 figures and 7 references, 2 of which are Soviet.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskii institut Akademii nauk SSSR (Leningrad Institute of Physics and Technology of the Academy of Sciences, USSR)

Card 3/4

LEMBERG, I. Kh.

7695
SOV/56-37-6-5/5524.6500, 24.6600,
24.6700, 16.8100

AUTHORS:

Alkhazov, D. G., Grinberg, A. P., Ousinskiy,
G. M., Erokhina, K. I., Lemberg, I. Kh.

TITLE:

Coulomb Excitation of Odd A-Nuclei by Heavy Ions

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki,
1959, Vol. 37, No. 6, pp 1530-1542 (USSR)

ABSTRACT:

High-lying levels in some light nuclei (Al^{27} , Sc^{45} , V^{51} , Mo^{93}), which because of background could not previously be observed when protons or α particles were used, have now been excited by using heavy ions as bombarding particles. The heavy ions Ne^{22+} , N^{14+} , N^{14+} , O^{16+} , Ne^{20+} , and Ne^{22+} at energy levels from 16 to 36 mev. The γ -radiation at energy levels of the target with the aid of a scintillation counter was registered with the aid of a scintillation spectrometer (cf. D. G. Alkhazov, D. S. Andreec, Zhur. eksp. i teoret. fiz., 33, 1347, 1958). The calibration of the

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spectrometer was determined by the γ -lines of Hg^{203} (279.5 kev), Ca^{41} (661 kev), Zn^{65} (1120 kev), and Co^{57} (1170 and 1332 kev). The reduced probability of internal conversion was calculated with the aid of the following equation:

$$R(E_2) = 0.55 \cdot 10^{-10} \frac{Z_1 Z_2 (1 - \frac{v}{c})^2}{E_2^2} \left(\frac{E_2}{E_1} \right)^{2L} \cdot (1)$$

(where Z_1 is the ion charge in the beam outside the cyclotron, C is the total coefficient of internal conversion; S_f is the number of γ -quanta registered at the peak of the total energy; N is the molecular weight of the substance comprising the target; W_2 is the nuclear charge of the atom under investigation (in the target); dE/dx are the specific losses of the ion energy in the target (in mev/(cm^2/cm^2)); η is the relative content of a given isotope

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in the element under investigation; E_f is the ratio of the number of γ -quanta registered at the peak of the total energy to the total number of γ -quanta falling on NaI(Tl) crystal; ω is the relative solid angle; λ is the portion of γ -quanta passing through the target and absorbed by the medium between the target and the crystal (0.3 mm Cu, 1.3 mm Al, 1 mm Na_2O , 0.05 mm Pb, and 0.05 mm mica); H is the reduced mass; n is the number of atoms of the element under investigation in the target; E is the collision energy; ΔE is the energy of the excited level; $f_2(E)$ is function of Coulomb excitation; ξ is parameter that is defined by the relation

$$\xi = 0.1575 Z_1 Z_2 \sqrt{H} (1/\sqrt{E} - \Delta E - 1/\sqrt{E});$$

and Z_2 is the nuclear charge of the bombarding particle). The analysis showed that some of the γ -lines observed

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Coulomb Excitation of Odd A-Nuclei by Heavy Ions 76965
SOV/56-37-6-5/55

in previous investigations, in which chromium was irradiated with protons or α -particles, are in levels due to coulomb excitation of the corresponding levels in chromium. It was shown that lines associated with nuclear levels owing to the G-excitation (R_{G1} , R_{G2} , R_{G3} , R_{G4}) are actually emitted as a result of coulomb excitation. The partial lifetimes τ_{G1} of the excited levels were determined to lie between 10^{-7} and 10^{-12} sec. A. B. Girardin made contributions in the course of this work. There is 1 table; 6 graphs; and 31 references, 8 Soviet, 1 Dutch, 1 Swiss, 2 French, and 19 U.S. The 5 most recent U.S. references are: P. K. McGowan, J. A. B. Bromley, H. E. Gove, A. S. 1956; R. A. Bull, Amer. Phys. Soc., 2, 178, 1957; L. R. G. S. 1957; M. A. Rothman, D. M. Van Patter, V. S. 1957; W. C. Porter, G. E. Mandeville, Phys. Rev., 107, 1551, 1957; R. M. Sinclair, Phys. Rev., 107, 1500, 1957.

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ASSOCIATION: Leningrad Phys.-Tech. Inst. Acad. Sciences USSR
(Leningradskiy fiziko-tekhnicheskii institut, Akademi
nauk SSSR)

SUBMITTED: July 2, 1959

Card 5/5

LEMBERG, I.KH.

"Coulomb Excitation of Nuclei Induced by Multi-Charged Ions"

report submitted for the 2nd USSR Conference on Nuclear Reactions at Low and Intermediate Energies, Moscow, 21-28 July 1960.

86163

26.2541
AUTHORS:

S/048/60/024/012/002/011
B019/B056

TITLE:

Gangrskiy, Yu. P., Gusinskiy, G. M., and Lemberg, I. Kh.

Study of the Decay Scheme $\text{Bi}^{212} \rightarrow \text{Po}^{212}$ by Means of $\alpha - \gamma$ -
and $\gamma - \gamma$ -Coincidences $\frac{19}{79}$

PERIODICAL:

Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960,
Vol. 24, No. 12, pp. 1449-1456

TEXT: The present paper was read at the 10th All-Union Conference on Nuclear Spectroscopy, which was held in Moscow from January 19 to January 27, 1960. In the introduction, the difficulties of a study of the Po^{212} -levels owing to the low half-life of this isotope ($3 \cdot 10^{-7}$ sec) were pointed out. The authors investigated the coincidence of the spectrum of Bi^{212} γ -rays with 8.78-Mev α -particles, for which purpose a 52-channel pulse-height analyzer with a resolution of $2 \cdot 10^{-6}$ sec was used. Likewise, the coincidence of the spectrum with γ -radiation with 727 kev γ -quanta was studied. In this γ -spectrum, lines with 586, 727, 786, 860, 893,
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Study of the Decay Scheme $\text{Bi}^{212} \rightarrow \text{Po}^{212}$ by
Means of α - γ - and γ - γ -Coincidences

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B019/B056

952 and 1073 keV occur. The levels determined in this way agree with those obtained by A. G. Sergeyev et al. (Ref. 1), but not with those obtained by Burde et al. (Ref. 2). For determining the level spins and multiplicities, the γ - γ angular correlations of the cascade γ -quanta with 786 - 727 and 1073 - 727 keV were investigated. Furthermore, the level of the lifetime was estimated. The Bi^{212} decay scheme shown in Fig. 8 was constructed from results obtained by investigations of the following four independent sources: 1) From values of the function $\log(ft)$ at transitions to an excited Po^{212} level. 2) According to the values of the conversion coefficients. 3) According to the γ - γ angular correlations. 4) According to the level lifetimes. This scheme agrees with that obtained by Sergeyev. The authors thank A. P. Grinberg for his great help. There are 8 figures, 5 tables, and 9 references: 3 Soviet, 4 US, and 1 Italian.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk SSSR (Institute
of Physics and Technology of the Academy of Sciences USSR)

Card 2/3

S/048/60/024/012/005/011
B019/B056

AUTHORS: Andreyev, D. S., Yerokhina, K. I., and Lemberg, I. Kh.

TITLE: Cascade Excitation of the Second Rotational Levels in
Separated Tungsten Isotopes ²⁷ 19

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960,
Vol. 24, No. 12, pp. 1470-1473

TEXT: The present paper was read at the 10th All-Union Conference on Nuclear Spectroscopy, which was held in Moscow from January 19 to January 27, 1960. By means of Coulomb excitation it was hitherto possible to excite even-even nuclei to the first rotational level. The excitation to the second rotational level was not possible. Protons and α -particles were used for excitation. In the introduction, the authors discuss several results obtained by earlier papers. The experiments described here were carried out by means of quadruply-charged Ne²⁰ ¹⁹ ions having an energy of 27.8 Mev, and by means of quadruply-charged N²⁰ ¹⁹ ions with an energy of 36 Mev. Four metallic tungsten targets were investigated, of which the

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Cascade Excitation of the Second Rotational
Levels in Separated Tungsten Isotopes

S/G48/60/024/012/005/011
B019/B056

first consisted of 87.6% W^{182} , the second of 90.1% W^{183} , the third of 91.3% W^{184} , and the fourth of 96% W^{185} . The γ -spectrum, which was emitted during the bombardment of the targets with heavy ions, was investigated by the author by means of a scintillation γ -spectrometer. The photo-multiplier pulses were amplified and recorded with a 63-channel amplitude analyzer, which had been developed by LETI. From the experimental results represented in diagrams and a detailed discussion, the authors became convinced that the γ -lines with the energies of 230 kev, 250 kev and 275 kev, which they had observed, represent the result of a double Coulomb excitation of states with the energies of 330, 360 and 400 kev in W^{182} , W^{184} and W^{186} . Similar results obtained by Newton et al. (Ref. 6) are mentioned. There are 3 figures, 1 table, and 6 references: 2 Soviet, 2 French, and 2 US. ✓

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk SSSR (Institute of Physics and Technology of the Academy of Sciences USSR)

Card 2/2

5/049/60/024/012/006/011
B019/8056

AUTHORS:

Antreev, B. A., Ginzburg, A. P., Ginzburg, G. V.,
Ierokhin, E. L., and Lombar, I. Kh.

TITLE:

Coulomb Excitation of the First Nuclear Levels of Even
Chromium-Selenium and Krypton-Indium

PERIODICAL:

Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1960,
Vol. 24, No. 12, pp. 1474-1477

The present paper was read at the 10th All-Union Conference on
Nuclear Spectroscopy, which was held in Moscow from January 19 to
January 27, 1960. The experiments described in the present paper were
carried out with 16.5-MeV and 38.0-MeV nitrogen ions and 2.5-MeV neon
ions. Results are given in Table 1. Chronic oxide targets were used, which
contain the isotopes Cr⁵² and Cr⁵⁴, as well as natural, vaporized chromium.
Further, natural metallic neodymium (23.87% Nd¹⁴⁴) was used. The results
are discussed in great detail and compared with earlier results. There
are 3 figures, 1 table, and 17 references; 3 Soviet and 14 US.

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ASSOCIATION: Fiziko-tekhnicheskii institut Akademii nauk SSSR (Institute
of Physics and Technology of the Academy of Sciences USSR)

Text to Table 1: 1) Excited nucleus; 2) Energy of the excited level;
3) Bombarding particle and its energy; 4) Reference level; 4a) Nuclear
4b) Energy of the excited level; 4c) Transition probability; 4d) Referen-
ces; 5) Transition probability according to published data; 7) Lifetime;
6) Transition probability according to published data; 7) Lifetime;
8) $P = B(E2)/B(E2)_{\text{single}}$ where $B(E2)$ is the single-particle transition
probability.

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Atom	Z	Excitation energy, MeV	Q	Mass	N.A.S. No.	Excitation energy, MeV	Reference
Cr ⁵²	24	0.78	0.13	Mo ⁹⁶	0.13	0.611	1
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	2
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	3
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	4
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	5
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	6
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	7
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	8
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	9
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	10
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	11
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	12
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	13
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	14
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	15
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	16
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	17

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Atom	Z	Excitation energy, MeV	Q	Mass	N.A.S. No.	Excitation energy, MeV	Reference
Cr ⁵²	24	0.78	0.13	Mo ⁹⁶	0.13	0.611	1
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	2
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	3
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	4
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	5
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	6
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	7
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	8
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	9
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	10
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	11
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	12
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	13
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	14
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	15
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	16
Cr ⁵⁴	24	0.84	0.15	Ni ⁵⁸	0.15	0.611	17

S/048/60/024/012/007/011
B019/B056

AUTHORS: Andreyev, D. S., Yerokhina, K. I., and Lemberg, I. Kh.

TITLE: The Coulomb Excitation of the Ne^{21} Nucleus

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960,
Vol. 24, No. 12, pp. 1478-1479

TEXT: The present paper was read at the 10th All-Union Conference on Nuclear Spectroscopy, which was held in Moscow from January 19 to January 27, 1960. Report is given in the present paper on the results obtained by experiments, in which the first level of Ne^{21} was excited. The γ -emission of graphite, aluminum, and molybdenum targets was studied during their bombardment with Ne^{21} ions, whose energy was 24.2 Mev. In all cases a γ -line with 0.35 Mev was found. The authors arrive at the conclusion that these lines, which are known already from previous papers, are not the result of a nuclear reaction but of a Coulomb excitation of Ne^{21} . From publications it is known that the quantum characteristics for the Ne^{21} -ground state are $3/2^+$, and for the first excited state $3/2^+$ or $5/2^+$. Thus,
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The Coulomb Excitation of the Ne^{21} Nucleus

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B019/B056

the authors obtained $0.025 \cdot 10^{-48} \text{e}^2 \text{cm}^4$ or $0.017 \cdot 10^{-48} \text{e}^2 \text{cm}^4$ for the probability $B(E2)$ of a transition from the ground state to the first excited state. For the partial lifetime of the first excited state one thus obtains $6.3 \cdot 10^{-10} \text{ sec}$ or $9.2 \cdot 10^{-10} \text{ sec}$. The authors thank A.B.Girshin for the faultless operation of the cyclotron. There are 1 figure and 8 references: 3 Soviet, 4 US, and 1 Danish. ✓

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk SSSR (Institute of Physics and Technology of the Academy of Sciences USSR)

Card 2/2

81786

S/032/60/026/07/15/055
B015/B068

5.5230

AUTHORS: Yerokhina, K. I., Lemberg, I. Kh., Makasheva, I. Ye.,
Maslov, I. A., Obukhov, A. P.

TITLE: Determination of Microimpurities in Silicon ²¹ From the
 γ -Spectra of Their Radioactive Isotopes ¹⁹

PERIODICAL: Zavodskaya laboratoriya, 1960, Vol. 26, No. 7, pp. 821-827

TEXT: A method of radioactivation analysis is described, with γ -radiation of the impurities in silicon applied in the production of semi-conductors being studied. The sample is activated in the neutron flux of a reactor. Work was performed in a flux of thermal neutrons with $9 \cdot 10^{12}$ neutrons $\cdot \text{cm}^{-2} \cdot \text{sec}^{-1}$. As the sample in the reactor is exposed to the action of fast neutrons in addition to slow ones, these nuclear transformations have also to be considered (Table 1). Since the major part of isotopes formed from Si is short-lived, only γ -radiation of Si^{31} must be considered in measurements. From the remaining neutron-activated elements, 44

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Determination of Microimpurities in Silicon From S/032/60/026/07/15/055
the γ -Spectra of Their Radioactive Isotopes B015/B068

about 50 isotopes with measurable γ -radiation form. In the present case, 17 elements (Table 2) were simultaneously determined with a scintillation-gamma-spectrometer (with an $\Phi\Xi\gamma$ -C (FEU-S) photoelectron multiplier) provided with a NaI (Tl) crystal. The unit was calibrated against known γ -spectral lines. The results obtained by analysis of two silicon samples are given in Table 3. Maximum sensitivity is (Table 4)

10^{-11} g for Au, 10^{-10} g for Ni, Mn, Cu, As, and Sb, and $5 \cdot 10^{-6}$ g for Sn. There are 2 figures, 4 tables, and 6 references: 2 Soviet, 3 American, and 1 British. 14

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk SSSR (Institute of Physics and Technology of the Academy of Sciences USSR)

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89247

24.6520 (1138, 1395, 1160)

S/048/61/025/001/013/031
B029/B060

AUTHORS: Andreyev, D. S., Grinberg, A. P., Yerokhina, K. I.,
Lemberg, I. Kh.

TITLE: Coulomb excitation of the nuclear levels of P^{31} , S^{33} , Mn^{55} ,
and Pr^{141} by means of Ne^{20} ions

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25,
no. 1, 1961, 70-76

TEXT: The measurements were made by means of a scintillation spectrometer with a NaI-Tl crystal (40 mm in diameter, 40 mm in height) and by means of a photomultiplier of the type $\Phi 3Y-11$ (FEU-11). The electronics consisted of a pre-amplifier, a cathode follower, an overchargeable amplifier and an AMA-2 (AMA-2) 63-channel pulse height analyzer connected in parallel and an AI 100-1 (AI 100-1) 100-channel pulse height analyzer. Method of measurement, apparatus, and course of the calculation of the reduced transition probability $B(E2)$ have already been

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X

Coulomb excitation of the nuclear levels...

S/048/61/025/001/013/031
B029/B060

described in three previous papers (Refs. 1-3). In the case of nitrogen ions the errors are below 15%, but they may attain from 20 to 25% for neon ions. The following was observed when measuring the energy of beam particles by means of deflection in a magnetic field: After deflection, the beam is split into several components corresponding to different charges of the accelerated ions. The change of the ions falling into the beam catcher causes the change of the ratio current strength / number of beam particles in the beam, which means that it influences the accuracy of calculation of the Coulomb excitation cross section. In the experiments concerned, the bombarding particles were quadruple-charged Ne^{20} ions with energies of 23.2 and 27.8 Mev. The amperage of the ion beam measured on the target was $\sim 1.10^{-8}\text{a}$. The measurement results are given in the attached Table. $R_0 = 1.2 \cdot 10^{-13} \text{A}^{1/3} \text{ cm}$ was set. Figs. 1,2,3,4 show the instrumental γ -spectra taken with Ne^{20} ions. The following notes are added concerning the individual elements: P^{31} : The Coulomb excitation of the level with $\Delta E = 1.26 \text{ Mev}$ of P^{31} was examined with the aid of ions Ne^{20} with an energy of 27.8 Mev. The target was pressed from a red phosphorus powder. The spectrum contains a gamma line with

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Coulomb excitation of the nuclear levels...

$E = 1.63$ Mev arising by Coulomb excitation of the level with $\Delta E = 1.63$ Mev in Ne^{20} . The value of $B(E2) \uparrow$ for the 1.26-Mev level of P^{31} amounted to $0.011 \cdot 10^{-48} \text{ e}^2 \text{ cm}^4$. The spins of the two states of P^{31} are known:

$I_0 = 1/2^+$ $I_f = 3/2^+$. S^{33} : In the work under consideration, S^{33} was excited by quadruple-charged Ne^{20} ions with an energy of 23.2 Mev. The gamma spectrum found contains a line with the energy 0.83 ± 0.01 Mev. Mn^{55} : The Mn^{55} was likewise excited by quadruple-charged Ne^{20} ions with 23.2 Mev. This spectrum contains gamma lines with energies of 0.85 and 0.98 Mev. Pr^{141} : Fig. 4 shows the spectrum of gamma rays resulting on the irradiation of praseodymium oxide with quadruple-charged Ne^{20} ions (27.8 Mev). The lifetime of the state with $\Delta E = 0.142$ Mev amounts to $2 \cdot 10^{-9}$ sec, and its partial lifetime is $4.3 \cdot 10^{-7}$ sec. The article under consideration is the reproduction of a lecture delivered at the 10th Conference on Nuclear Spectroscopy, which took place in Moscow from January 19 to 27, 1960. There are 4 figures, 1 table, and 24 references: 7 Soviet-bloc and 17 non-Soviet-bloc.

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Coulomb excitation of the nuclear levels...

ASSOCIATION: Fiziko-tehnicheskii institut Akademii nauk SSSR (Institute of Physics and Technology, Academy of Sciences USSR)

Ядро	ΔE , MeV	ΔE^* , MeV	$\frac{B(E2)}{e^2} \times 10^{-4}$, cm ²	$\tau(E2)$, ссн	τ , ссн	τ^* , ссн	F
P ³¹	1,26 ± 0,02	1,264 [5]	0,011	4,8·10 ⁻¹²	1,0·10 ⁻¹²	—	9,1
S ³²	0,83 ± 0,01	0,844 ± 0,006 [6] 0,839 ± 0,005 [7]	0,0019	5,2·10 ⁻¹¹	< 5,2·10 ⁻¹¹	—	1,0
Mn ⁵⁵	0,98 ± 0,01	0,983 [8]	0,012	(5±13)·10 ⁻¹²	—	—	4,0+5
Pr ¹⁴¹	0,142 ± 0,003	0,142 [9]	0,0036	4,3·10 ⁻⁷	—	2·10 ⁻⁹ [10,11]	4,3

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B029/B060

Coulomb excitation of the nuclear levels...

Legend to the Table: ΔE , level energy measured in the experiments, ΔE^* , level energy according to results from other papers, $B(E2)^\uparrow$, reduced probability of the electric quadrupole excitation of the level, $\tau(E2)$, partial lifetime of the level relative to the electric quadrupole transition of the nucleus into the ground state, τ , total lifetime of the level, τ^* , lifetime of the level according to data from other papers, F , ratio between value of $B(E2)^\uparrow$ measured in the experiments and value $B(E2)_{\text{single particle}}$ calculated on the basis of the single-particle approximation.

Legend to the Figures: Instrumental γ -spectra, obtained in the case of Coulomb excitation with quadruple-charged Ne^{20} ions of phosphorus at 27.8 Mev (Fig. 1), of S^{33} at 23.2 Mev (Fig. 2); of Mn at 23.2 Mev (Fig. 3)- a without, b with lead filter, 1.25 mm thick; of Pr at 27.8 Mev (Fig. 4).

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26439

S/048/61/025/007/001/005

B108/B209

AUTHORS: Andreyev, D. S., Vasil'yev, V. D., Gusinskiy, G. M.,
Yerokhina, K. I., and Lemberg, I. Kh.

TITLE: Study of the Coulomb excitation of nuclear levels with the
aid of accelerated multiply charged ions

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 25,
no. 7, 1961, 832 - 847

TEXT: This paper was read at the XI Annual Conference on Nuclear Spectroscopy in Riga, January 25 - February 2, 1961. The purpose of the studies was to improve the results of earlier work (Ref. 1: Andreyev, D.S. et al., Nucl. Phys., 19, 400 (1960); Ref. 2: Alkhazov, D. G. et al., Zh. eksperiment. i teor. fiz., 37, 1530 (1959)) by the method of reference levels (Ref. 1) which consists in measuring the excitation cross section of a reference level before and after measuring the excitation cross section of the level to be investigated. The following nuclear levels were used as reference levels: 0.44 Mev of Na^{23} ($B(E2)_{\uparrow} = 0.11 \cdot 10^{-48} \text{ e}^2 \text{ cm}^4$) for studying Li and B; 1.19 Mev of Ni^{62} ($B(E2)_{\uparrow} = 0.085 \cdot 10^{-48} \text{ e}^2 \text{ cm}^4$) for

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Study of the Coulomb...

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B108/B209

studying Co; 0.76 Mev of Se^{76} ($B(E2)\uparrow = 0.42 \cdot 10^{-48} \text{ e}^2 \text{ cm}^4$) for studying Mg, Ca, and Se; 1.15 Mev of Sn^{122} ($B(E2)\uparrow = 0.26 \cdot 10^{-48} \text{ e}^2 \text{ cm}^4$) for studying In, Sb, and Ce; 1.60 Mev of Ce^{140} ($\tau = 1.1 \cdot 10^{-13} \text{ sec}$) for studying the even Sn isotopes and Ba^{138} ; 0.16 Mev of Ti^{47} ($B(E2)\uparrow = 0.040 \cdot 10^{-48} \text{ e}^2 \text{ cm}^4$) for studying Sn^{117} . The excitation probability, $B(E2)\uparrow$, was determined with an error of 15 - 20%. Tables 1 and 2 contain the results of measurements. In all these studies, the authors made use of the broadening of the energy band of multiply charged ions accelerated in the cyclotron at the FTI (Institute of Physics and Technology). Ne ions having 16 - 18 Mev were used for studying the nuclear levels of light elements such as Li and B, and were also successfully applied to exciting higher levels in light and medium elements (Mg^{25} , Mg^{26} , Ca^{44} , Co^{59} , In^{115} , and Sb). 52.5-Mev ions of N were able to excite the levels with energies of 1.4 - 1.6 Mev of heavier nuclei (Ba^{138} and Ce^{140}). The nuclear levels of even-even isotopes were chiefly examined to complete the data on even-even nuclei and to compare results (Ref. 16: Kisslinger, Card 2/6

Study of the Coulomb...

26439,
S/048/61/025/007/001/005
B108/B209

L. S., Sorensen, R. A., Dansk. Mat.-Fys. Medd., 32, No. 9 (1960))
(cf. Table 3).. There are 16 figures, 3 tables, and 42 references:
7 Soviet-bloc and 31 non-Soviet-bloc.

Table 1. Coulomb excitation of levels (spin 2^+) in even-even nuclei.

Legend: (1) Isotope, (2) level energy, Mev, (3) excitation probability,
(4) level lifetime, 10^{-13} sec, (5) ratio of $B(E2)_{\uparrow}$ to the same quantity
as estimated for a one-particle model (the nuclear radius in the calculations was assumed to be $R_0 = 1.2 \cdot 10^{-13} A^{1/3}$ cm).

Table 2. Coulomb excitation of levels in nuclei with odd A and in odd-odd B^{10} nuclei.

Legend: (1), (2), (3) see Table 1, (6) nuclear spin in ground state,
(7) nuclear spin in excited state, (8) partial lifetime of the level
relatively to the electric quadrupole transition, sec.

Legend to Table 3: (1) Nucleus, (2) calculated value of $B(E2)$ as taken
from Ref. 16, (3) experimental value of $B(E2)$.
Card 3/6

SAPOZHNIKOV, D.I.; ALKHAZOV, D.G.; EYDEL'MAN, Z.M.; BAZHANOVA, N.V.; LEMBERG,
I.Kh.; MASLOVA, T.G.; GIRSHIN, A.B.; POPOVA, I.A.; SAAKOV, V.S.; POPOVA,
O.F.; SHIRYAYEVA, G.A.

Incorporation of O^{18} from heavy oxygen water into violaxanthin due to
the action of light on plants. Bot. zhur. 46 no. 5:673-676 My '61.
(MIRA 14:7)

1. Botanicheskiy institut imeni V.L. Komarova AN SSSR, Leningrad.
(Oxygen—Isotopes) (Violaxanthin)

S/903/62/000/000/024/044
B102/B234

AUTHOR: Lemberg, I. Kh.

TITLE: Investigation of Coulomb excitation of nuclear levels with the help of multiply charged ions

SOURCE: Yadernyye reaktsii pri malykh i srednikh energiyakh; trudy Vtoroy Vsesoyuznoy konferentsii, iyul' 1960 g. Ed. by. A. S. Davydov and others. Moscow, Izd-vo AN SSSR, 1962, 308-321

TEXT: The author reports on measurements made and the most important results obtained during the years since 1958 in the cyclotron laboratories of the Leningrad Fiziko-tekhnicheskii institut Akademii nauk SSSR (Physico-technical Institute of the Academy of Sciences USSR) with accelerated multiply charged ions (C^{12} , O^{16} , Ne^{20} , Ne^{21} , Ne^{22} and nitrogen whose ions, since 1960, may be accelerated up to 55 Mev). Greater accuracy in measurement and calculation made it possible to reduce the error in $B(E2)^\dagger$ determination to 20% or less. Tables show the level energy, the excitation probability and the level lifetime for a total of 33 even-even isotopes, as well as the energy, excitation probability and lifetime and the spin and parity of the ground state and excited states for another 27 odd isotopes
Card 1/2

Investigation of Coulomb excitation...

S/903/62/000/000/024/044
B102/B234

(odd A). For Ne, Mg, Si, Ca⁴⁴, Ti, Cr, Fe, Ni, Zn, Se, Zr, Ba¹³⁸, Ce¹⁴⁰, Nd, Li, B¹⁰, Ne²¹, Mg²⁵, Al, P³¹, S³³, Sc, Co, Ng, In¹¹⁵, Sn, Sb, and Pr, the results indicate that the application of multiply charged ions considerably enlarges the region of light nuclei whose lifetime data may be obtained via Coulomb excitation, thus, e.g. also for Li⁷ and B¹⁰ ($B(E2) \uparrow / e^2 = (10^{-3} \text{ and } 2 \cdot 10^{-4}) \cdot 10^{-48} \text{ cm}^4$). It allows also of investigating Coulomb excitation of the first levels of medium and heavy elements with closed shells (e.g. Ba¹³⁸, Ce¹⁴⁰, Cr⁵²) for which α or proton experiments were not successful. Furthermore it proved possible to excite very high levels, such as 1.63 Mev (Ne²⁰), 1.61 Mev (Ce¹⁴⁰), 1.78 Mev (Si²⁸) and 1.83 Mev (Mg²⁶). The heavy-ion method is also better suited for lifetime determinations; the accuracy is almost equal to that of the gamma resonance scattering method. The $B(E2)$ values obtained are in good agreement with theoretical results obtained by Kisslinger-Sørensen (Mat.-Fys. Medd. Dan. Vid. Selsk. 32, No. 9, 1960) on the basis of the theory of S. T. Belyayev. There are 7 figures and 4 tables.

ASSOCIATION: Leningradskiy fiziko-tehnicheskii institut AN SSSR (Leningrad Physicotechnical Institute AS USSR)
Card 2/2

ALKHAZOV, D. G.; GANGRSKIY, Yu. P.; LEMBERG, I. Kh.; UDRALOV, Yu. I.

Energy resolution of silicon p-n detectors in the recording
of heavy ions. Izv. AN SSSR. Ser. fiz. 16 no.12:1506-1507
D '62. (MIRA 16:1)

(Nuclear counters—Design and construction)
(Ions)

S/048/62/026/002/006/032
B101/B1G2

AUTHORS: Yerokhina, K. I., and Lemberg, I. Kh.

TITLE: Coulomb excitation of nuclear levels of copper, germanium, molybdenum, and palladium isotopes

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 2, 1962, 205-211

TEXT: The Coulomb excitation of Cu^{63} , Cu^{65} , Ge^{70} , Ge^{72} , Mo^{94} , Mo^{96} , Mo^{98} , Mo^{100} , Pd^{104} , Pd^{106} , Pd^{108} , and Pd^{110} was studied by means of quadruply-charged 36-Mev nitrogen ions. The energy of incident particles was 97 % of the barrier energy for Cu, 98 % for Ge, 78 % for Mo, and 74 % for Pd. The reference levels were those of Se^{78} ($\Delta E = 0.615$ Mev, $B(E2)\uparrow = 0.36 \cdot 10^{-48} \text{ e}^2 \text{ cm}^4$) and Ni^{60} ($\Delta E = 1.33$ Mev, $B(E2)\uparrow = 0.11 \cdot 10^{-48} \text{ e}^2 \text{ cm}^4$). With Cu^{63} , the 0.67-, 0.96-, 1.33-, and 0.37-Mev gamma lines were observed. The first three lines correspond to Coulomb excitation of the first three levels and to the transitions to the ground state. The 0.37-Mev line corresponds to the transition from the 1.33-Mev level over the 0.96-Mev level to the ground

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Coulomb excitation of nuclear levels...

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B101/B102

state. With Cu^{65} , the 0.78-, 1.11-, and 1.48-Mev lines were produced by Coulomb excitation of the first three levels. In addition, lines corresponding to ~ 320 - and 370-kev gamma quanta were emitted as a result of successive transitions from the 1.48-Mev level over the 1.11-Mev level, and from there over the 0.77-Mev level. In examining Coulomb excitation of Ge, both native Ge and Ge enriched in Ge^{76} up to 76 % were used as targets. The Coulomb excitation of even isotopes of Mo and Pd was examined for the first time. The results are collected in the following table:

	$\Delta E, \text{Mev}$	$\frac{B(E2)\uparrow}{e^2} \cdot 10^{48}$ cm ⁴	$\tau(E2), \text{sec};$	τ, sec	δ^2	K	$\frac{B(E2)\uparrow}{e^2} \cdot 10^{48}$ cm ⁴ ✓
Cu^{63}	0.67	0.013	$2.3 \cdot 10^{-11}$		0.013		0.026
Cu^{63}	0.96	0.038	$3.8 \cdot 10^{-12}$		0.23	0.007	0.025
Cu^{63}	1.33	0.053	$7.0 \cdot 10^{-13}$	$6.4 \cdot 10^{-13}$		0.10	0.027
Cu^{65}	0.78	0.010	$1.4 \cdot 10^{-11}$		0.017		0.020
Cu^{65}	1.11	0.028	$2.5 \cdot 10^{-12}$			0.06	0.019

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Coulomb excitation of nuclear levels...

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$\Delta E, \text{Mev}$	$\frac{B(E2)^\uparrow}{e^2} \cdot 10^{48}$ cm ⁴	$\tau(E2), \text{sec};$	τ, sec	δ^2	K	$\frac{B(E2)^\uparrow}{e^2} \cdot 10^{48}$ cm ⁴
Cu ⁶⁵ 1.48	0.034	6.6 · 10 ⁻¹³	5.8 · 10 ⁻¹³		0.13	0.017
Ge ⁷⁰ 1.02	0.18					
Ge ⁷² 0.84	0.21					
Ge ⁷⁴ 0.59	0.30					
Ge ⁷⁶ 0.56	0.28					
Mo ⁹⁴ 0.87	0.23					
Mo ⁹⁶ 0.78	0.24					
Mo ⁹⁸ 0.78	0.26					
Mo ¹⁰⁰ 0.53	0.63					
Pd ¹⁰⁴ 0.56	0.61					
Pd ¹⁰⁶ 0.51	0.61					
Pd ¹⁰⁸ 0.43	0.82					
Pd ¹¹⁰ 0.37	0.78					

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Coulomb excitation of nuclear levels...

S/048/62/026/002/006/032
B101/B102

There are 5 figures, 3 tables, and 17 references: 1 Soviet and 16 non-Soviet. The four most recent references to English-language publications read as follows: Cumming, J. B., Popile, N. T., Phys. Rev., 122, 1267 (1961); Cumming, J. B., Schwarzschild, A., Sunyar, A. W., Portile, N. T., Phys. Rev., 120, 2128 (1960); Jambunathan, R., Gunye, M. R., Sarat, B., Phys. Rev., 120, 1839 (1960); Booth, E. C., Bull. Amer. Phys. Soc., 5, 239 (1960). ✓

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe Akademii nauk SSSR (Physicotechnical Institute imeni A. F. Ioffe of the Academy of Sciences USSR)

Card 4/4

S/048/62/026/002/007/032
B101/B102

AUTHORS: Gangrskiy, Yu. P., and Lemberg, I. Kh.

TITLE: Double Coulomb excitation of the 0^+ level in Ge^{70}

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 2, 1962, 212-214

TEXT: The double Coulomb excitation $0^{'+}$ was examined by bombarding a Ge target with multiply charged 36-Mev nitrogen ions accelerated in the cyclotron of FTI. The gamma radiation was recorded by two NaI(Tl) scintillation counters connected to a gate circuit with a time resolution of $2 \cdot 10^{-8}$ sec. The one-channel discriminator was adjusted to the recording of 1036-keV gamma quanta. The spectrum of coincidences with 1036-keV quanta was recorded by a 64-channel pulse-height analyzer. The 174-keV line observed corresponds to the discharge of the $0^{'+}$ level. The double Coulomb excitation cross section at $\theta = 0$ is given by $\sigma_{E_2 E_2} = 0.027 a^{-2} \sigma_{E_2}(0 \rightarrow 2) \sigma_{E_2}(2 \rightarrow 0')$, where a is half the least distance

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Double Coulomb excitation of the...

S/048/62/026/002/007/032
B101/B102

between incident particle and nucleus, $\sigma_{E2}(0 \rightarrow 2)$ is the Coulomb excitation cross section of the first level with spin 2^+ , and $\sigma_{E2}(2 \rightarrow 0')$ is the excitation cross section from the first to the second level. For $B(E2, 2 \rightarrow 0')$ one finds $0.10 \cdot 10^{-48} \text{ e}^2 \text{ cm}^4$. $B(E2, 0' \rightarrow 2) = 0.50 \cdot 10^{-48} \text{ e}^2 \text{ cm}^4$ is obtained and $B(E2, 0' \rightarrow 2) = (0.63 \pm 0.12) \cdot 10^{-48} \text{ e}^2 \text{ cm}^4$ is found from the lifetime of the $0'^+$ level. The experimental error is 30 % since the equation for σ_{E2E2} is accurate only for $\xi = 0$, whereas in the experiment it had been found that $\xi = 0.35$ for the excitation of the first level, and $\xi = 0.062$ for $2 \rightarrow 0'$. $B(E2)$ for the excitation of the first level with the spin 2^+ was found to equal $(0.18 \pm 0.03) \cdot 10^{-48} \text{ e}^2 \text{ cm}^4$. $B(E2, 0' \rightarrow 2)$ is three times greater than $B(E2, 0 \rightarrow 2)$, which is indicative of its collective nature. There are 2 figures and 6 references: 2 Soviet and 4 non-Soviet. The four references to English-language publications read as follows: Newton, J. O., Stephens, F. S., Phys. Rev. Lett., 1, 63 (1958); Nathan, O.; Popov, V. T.,

Card 2/3

Double Coulomb excitation of the...

S/048/62/026/002/007/032
B101/B102

Nucl. Phys., 21, 631 (1960); Kendall, H. W., Phys. Rev., 109, 861 (1959);
Alder, K., Bohr, A., Huus, T., Mottelson, B., Winter, A., Rev. Mod. Phys.,
38, 432 (1956).

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe Akademii nauk
SSSR (Physicotechnical Institute imeni A. F. Ioffe of the
Academy of Sciences USSR)

Card 3/3

h0093

S/048/62/026/008/004/028
B163/B104

24.6300

AUTHORS: Vasil'yev, V. D., Yerokhina, K. I., and Lemberg, I. Kh.

TITLE: Investigation of Coulomb excitation of levels in the nuclei
 Fe^{57} , Ge^{73} , Rh^{103} , Pd^{105} , In^{113} , In^{115} , and Sn^{115}

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26,
no. 8, 1962, 992 - 997

TEXT: The nuclei listed in the title were bombarded by $\text{N}^{14;4+}$ ions with energies of 30 Mev in the case of Fe^{57} , 36 Mev in that of Ge^{73} and 42 Mev in all others. A number of nuclear levels not yet studied by Coulomb excitation were found and their reduced upward transition probabilities $B(E2)$, parities, spin limits and partial life times $\tau(E2)$ were determined. The error of the $B(E2)$ values is of the order of 20 to 30%. The results are given in the table. There are 6 figures and 1 table.

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